



Mathematics Curriculum

Statement of Intent, Implementation, Impact

The school's vision and educational aims for Mathematics are to provide a rigorous academic curriculum that is ambitious, challenging, enriching and inclusive. This is in line with the school's aims to encourage high aspirations in order to maximise progress and enable all pupils to experience success. Our aims for Mathematics reflect the aims of the National Curriculum whilst also striving to prepare pupils to be numerically competent in their later life. We also endeavour to foster a love of Mathematics and problem solving which leads pupils to continue the study of the subject upon leaving the school.

The knowledge and skills that pupils develop in their mathematics lessons make a valuable contribution to other areas of the school curriculum. Subjects such as Science, Geography and Engineering benefit from having pupils who are fluent in a wide range of mathematics.

The curriculum is reviewed constantly and in a collaborative fashion. We have a clear plan for what pupils should know and be able to do at the end of both KS3 and KS4. This is very clearly detailed in all schemes of work.

Content is sequenced so that new knowledge builds on prior knowledge. This is particularly pivotal in Year 7 where our curriculum builds on what has been taught at Primary School.

As well as carefully sequenced content we attempt to change attitudes and stereotypical views of Mathematics. In society we often here "I was never any good at Maths" or "I'm not a Maths person". This has become a somewhat accepted phrase but if you replaced the word Maths with 'reading' or 'writing' a different picture starts to emerge and this is why this phrase must be challenged. Mathematics is the bedrock of any civilised society and all pupils must move away from holding this attitude if they are to truly appreciate the subject.

Implementation

In Years 7, 8 & 9 pupils are taught for 3 hours a week in groups that are put together based upon a pupil's ability. Within each year group there are 3 variations on the scheme of work which ensures pupils are studying material which builds upon previously taught concepts at a pace and depth that is best suited to the pupil.

The bottom group in both Year 7 and 8 use an intervention program called Accelerated Maths which allows teachers to personalise practice, differentiate instruction and monitor progress to guide each pupil to success.

In Year 10 pupils are taught for 4 hours a week and in Year 11 3 hours. As in Key Stage 3, pupils are grouped by ability. Currently sets 1-4 follow the Edexcel Higher SOW with the remaining groups following the Foundation SOW. Approximately two thirds of the cohort are entered for the Higher tier with the remaining third sitting the Foundation Tier.

Covid Amendment

Due to pupils having missed so much school it was decided that Year 10 Set 4 and 5 would follow a 'Crossover' curriculum from September 2020 which covered the material which

normally features at the end of a Foundation paper and the start of a Higher paper. It was felt that Set 4 may find starting straight into Higher extremely difficult after so long away from school. It also gave pupils in Set 5 the opportunity to potentially go forwards and take the Higher tier in year 11, an opportunity which is not normally available.

Movements between groups are made as required and there is no set period in which teachers can move pupils. This allows for movements to be made as needed so that pupils are in the appropriate group as soon as possible

All pupils are taught by a subject specialist. Sharing good practice is naturally embedded within the department with time also dedicated within departmental meetings for this. The subject leader regularly attends meetings of other subject leaders to discuss current good practice which is then fed back to colleagues in departmental meetings.

Mathematics is a highly hierarchical discipline and our curriculum choices reflect this. Learning is coherently sequenced so that new concepts are built on top of existing ones. Units of work are all sequenced in this fashion so that pupils can build confidently on what they already know. Before starting a unit of work, teachers check pupil's prior understanding so that any gaps in knowledge can be addressed before continuing.

Teachers in the department make excellent use of mini-whiteboards to check for understanding when decided whether to progress a concept or revisit certain aspects of it. Questioning is a key tool used throughout the department to inform next steps in lessons. This adaptive approach is embedded into the fabric of the department. Teachers use a variety of techniques to check for understanding to ensure that pace and content are appropriate.

The department is aware of research into Cognitive Load Theory and its implication in the classroom. Topics are broken down into small steps to ensure that the cognitive load placed on pupils working memory is not overloaded. Similarly, when using worked examples teachers are aware that listening, watching and copying down notes simultaneously is again placing too much strain on working memory and so strategies are utilised to minimise this load.

Teaching for understanding is a priority within the department. Teachers put equal emphasis on both the 'why' and the 'how' when covering new concepts. Weekly retrieval practice is scheduled for all classes in each year to give pupils the opportunity to transfer concepts into long term memory. Retrieval practice is now routine at the start of all lessons as well as through a weekly task set on the Hegarty Maths platform which serves pupils a selection of 10 questions they have answering correctly previously with AI spacing the retrieval of these appropriately.

Pupils are also set weekly homework using Hegarty Maths as well as written tasks. These homework tasks are set on topics previously covered which gives pupils the opportunity to retrieve the information again with the aim of transfer into long term memory.

Lesson observations show that all teachers make explicit reference to new subject specific vocabulary and insist on pupils using new vocabulary in an accurate way during in class discussion. From observations it is also clear that teachers consistently use tier 2 vocabulary during their lessons. This contributes to the wider whole school focus on literacy.

Assessment in KS3 is undertaken using unit tests which accompany the SOW. Key here is that tests are delayed so that results measure how much content has been transferred to long term memory rather than recent experience giving a false picture of a pupil's understanding. Pupils are expected to correct mistakes made on these tests following live modelling from the teacher. Teachers can then use the results of these assessments to identify any pupils who need further help with a topic.

Unit tests are again used in KS4 but only in Year 10. Formal mock exams are undertaken in Year 11 to allow teachers to get a true picture of where pupils are as they approach the GCSE exam.

Feedback plays a crucial role in the development of pupils at Broughton. All pupils receive regular feedback on how they can improve. This is particularly evident in Year 11 where pupils complete a past GCSE paper every fortnight which is marked by the teacher with a lesson then used immediately afterwards for pupils to receive verbal feedback on where they made mistakes or could have used a more efficient method.

Impact

Performance in Maths at Broughton exceeds all expectations with both attainment and progress measures significantly above the national average. In 2018/19 the percentage of pupils achieving a Grade 7+ was 36.2% compared to a National figure of 16.1%. The average points score of the 2019 cohort was 5.8 which is over a full grade higher than the national average of 4.7.

Progress measures show that pupils in 2019 achieved over a third (+0.39) of a grade higher than expectation with disadvantaged and SEND pupils making equally good progress acquiring the mathematical skills and knowledge needed for later in life. Without Maths qualifications there are less opportunities available to young people. Over 91% of pupils left Broughton in 2019 with a standard pass in their GCSE enabling them to access the next phase in their education without the need to re-sit Maths.

High uptake at A-Level gives some indication that teachers do a good job of fostering an enjoyment and curiosity of mathematics. A key factor in pupil's enjoyment of the subject is that they are taught by a subject specialist. As a department we could do more to gather information on pupils' perceptions from pupil voice. This is something we will look to develop in the next academic year.

Regular work scrutiny shows that pupils have covered the intended curriculum. This scrutiny shows that pupils make accurate use of mathematical terminology and notation. It is also clear that much thought and effort go into the communication of mathematics with detailed and methodical work plain to see. We are mindful that this does not show that they have learnt the intended curriculum which is why we delay testing for a period after a topic is taught. There is clear evidence in books that feedback is having an impact with all pupils responding to feedback using a purple pen. The department makes good use of whole class feedback to ensure that workload is minimised for teachers where possible.

Using Hegarty Maths gives pupils live feedback on the questions they have attempted with a second chance available. This allows pupils to develop self-checking strategies and affords them the opportunity to develop self-regulation.

Covid Curriculum

March – July 2020

The curriculum was delivered through the use of Hegarty Maths which allowed staff to set weekly tasks for their class. These tasks involved pupils completing quizzes on topics in line with the curriculum as well as watching high quality videos produced by Hegarty Maths. The self-marking quizzes allowed staff to keep an overview of pupil learning in the period away from school with intervention possible via contact with parents and direct contact with pupils.

September - December 2020

Due to the long period away from school, the department adopted a system of systematic retrieval which covered topics from the end of the previous academic year. These topics were revisited at the start of lessons. These topics were then interleaved with new material that had been covered since the start of the year. As an example, a pupil may be presented with questions from topics that they had covered in the first lockdown, 2 months ago and 2 weeks ago.

There was a real emphasis on rebuilding pupil's confidence after an extended period away from school. No mention was made of tasks that had been missed previously.

As the year progressed and more and more pupils were forced to self-isolate the Maths department was instrumental in introducing the hybrid model of allowing pupils from home to join lessons live so that they received the same instruction as their peers.

January 2021 – March 2021

With school closing again the department moved to delivering lessons as per timetable 'live' via Microsoft Teams. Due to the remote nature of this delivery, not all topics from the curriculum were suitable for teaching. This included topics which required specialist equipment such as constructions, angles etc. It was left to individual teachers to make the decision as to what was suitable and what was not. The topics which were left out were then covered upon our return to school in March 2021.

Throughout this lockdown period staff made use of graphics tablets to continue the live modelling of concepts through written examples which pupils could see on their screen. Alongside this, the department made use of Hegarty Maths to set pupil quizzes so that progress could be viewed live within the lesson. The department also adopted Dr Frost Maths for the same reason and to keep the experience varied for pupils. Whiteboard.fi was used for formative assessment, allowing teachers to see live pupil work on digital whiteboards.

March 2021 – Present

Prior to returning to school, it was decided that a supportive and non-judgemental approach was the best way forwards. Staff made a point of giving pupils a fresh start once back in school. Work and lessons that had been missed during the lockdown were addressed through routine retrieval practice at the start of lessons and through regular low stakes testing. Topics that had been 'skipped' in lockdown due to unsuitability were now covered. Pupils in Year 10 were identified to take part in the National Tutoring Programme which involved 2 x 1 hour sessions per week with a remote tutor.